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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/808,763	03/24/2004	Kevin J. Lee	42P6148D	5901
8791	7590	10/09/2007		
BLAKELY SOKOLOFF TAYLOR & ZAFMAN 1279 OAKMEAD PARKWAY SUNNYVALE, CA 94085-4040			EXAMINER ZHENG, LOIS L	
			ART UNIT 1793	PAPER NUMBER
			MAIL DATE 10/09/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/808,763	Applicant(s) LEE, KEVIN J.	
	Examiner Lois Zheng	Art Unit 1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 August 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 30 August 2007 has been entered.

Status of Claims

2. Claim 1 is amended in view of applicant's amendment filed 30 August 2007. Therefore, claims 1-7 are currently under examination.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gealer et al. US 4,765,865(Gealer) in view of Zechman US 3,774,079(Zechman).

Gealer teaches an electroetching apparatus selectively removing a conductive layer from a wafer substrate via a mask(abstract). The electroetching apparatus of Gealer comprises a potentiostat(Fig. 2 #22) having three terminals each connected to a counter electrode(Fig. 2 #10), a working electrode couple to the substrate(Fig. 2 #9) and

Art Unit: 1742

a reference electrode(Fig. 2 #23) respectively, Gealer further teaches a reaction vessel storing the electrolyte and housing the wafer substrate, the counter electrode and the reference electrode that are immersed in the electrolyte(Fig. 2 # 13).

Regarding claim 1, Gealer teaches all the components of the claimed apparatus except the amended feature of an independent clip electrically coupled to a portion of the conductive layer on the substrate.

Zechman teaches electrolytically fabricating semiconductor circuits comprising positioning the semiconductor wafer and providing electrical current to the wafer via an annular clip(Fig. 1 #5).

Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated the annular contact clip as taught by Zechman into the electroetching apparatus of Gealer in order to provide a large contact surface area to ensure adequate current flow as taught by Zechman(col. 3 lines 56-63).

In addition, the claimed substrate having sub-micron interconnect features does not lend patentability to the instantly claimed apparatus since the substrate is directed to a subject that is worked on by the claimed apparatus. It is well settled that "expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim". *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969). Furthermore, "[i]nclusion of material or article worked upon by a structure being claimed does not impart patentability to the claims." *In re Young*, 75 F.2d 996, 25 USPQ 69 (CCPA 1935) (as restated in *In re Otto*, 312 F.2d 937, 136 USPQ 458, 459 (CCPA 1963)). See MPEP 2115 [R-2].

Furthermore, the claim recitation of how the potential difference between the substrate and the reference electrode is maintained and when the selective removal of conductive layer is ended does not lend patentability to the instant apparatus claims since they are directed to how the claimed apparatus is being operated. It is well settled that a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). See MPEP 2114. Since the recited process limitations do not structurally differentiate the claimed apparatus from the apparatus of Gealer in view of Zechman, the recited process limitations do not render the instant claim patentable.

Furthermore, with respect to the amended claim feature that the conductive layer "consisting of nickel", the examiner does not find that the claimed nickel conductive layer would render the instant claim 1 patentable since the nickel conductive layer is directed to the article worked on by the instantly claimed apparatus and does not provide any structural limitation that would differentiate the apparatus of claim 1 to the prior art. It is well settled that material or article worked upon does not limit apparatus claims. See MPEP 2115[R-2].

The examiner also maintains a position that the apparatus of Gealer in view of Zechman is capable of performing in the claimed fashion.

Regarding claim 2, the apparatus of Gealer in view of Zechman is capable of varying a current between the substrate and the counter electrode to maintain the potential different at a fixed value as claimed(col. 5 lines 40-43).

Regarding claims 3-7, the claimed conductive layer, barrier layer and the sub-micron interconnect features are directed to the wafer substrate which is worked on by the claimed apparatus. Therefore, these claim limitations does not lend patentability to the instant apparatus claims for the same reasons as stated in the rejection of claim 1 above. See MPEP 2115 [R-2].

5. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gealer et al. US 4,765,865(Gealer) in view of Shaw US 3,560,357(Shaw).

The teachings of Gealer are discussed in paragraph 4 above. However, Gealer does not explicitly teach the claimed amended feature of an independent clip electrically coupled to a portion of the conductive layer on the substrate.

Shaw teaches an apparatus for selective electroetching of a substrate(title). Shaw further teaches using a spring clip for positioning the substrate in an electrolytic bath and to provide electrical current to the substrate(Fig. 2 #19, col. 3 lines 55-68).

Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated the spring clip as taught by Shaw into the electroetching apparatus of Gealer in order to hold and position the substrate in the electrolytic bath at the same time providing electrical current to the substrate as shown in Shaw.

The remaining claim limitations regarding claims 1-7 are rejected for the same reasons as stated in paragraph 3 above.

6. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gealer et al. US 4,765,865(Gealer) in view of Van Dijk US 3,616,345(Van Dijk).

The teachings of Gealer are discussed in paragraph 4 above. However, Gealer does not explicitly teach the claimed amended feature of an independent clip electrically coupled to a portion of the conductive layer on the substrate.

Van Dijk teaches an apparatus for selective electroetching of a substrate(title). Van Dijk further teaches using a clip for positioning the substrate in an electrolytic bath and to provide electrical current to the substrate(Fig. 4 #30-31, col. 4 lines 24-71).

Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated the spring clip as taught by Van Dijk into the electroetching apparatus of Gealer in order to hold and position the substrate in the electrolytic bath at the same time providing electrical current to the substrate as shown in Van Dijk.

The remaining claim limitations regarding claims 1-7 are rejected for the same reasons as stated in paragraph 3 above.

7. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nojiri et al. US 5,173,149(Nojiri) in view of Zechman US 3,774,079(Zechman).

Nojiri teaches an electroetching apparatus for selectively removing a conductive layer from a wafer substrate(abstract). The electroetching apparatus of Nojiri comprises a potentiostat(Fig. 5 #21) having three terminals each connected to a counter electrode(Fig. 5 #4), a working electrode couple to the substrate(Fig. 5 #3) and a reference electrode(Fig. 5 #22) respectively, Nojiri further teaches a reaction vessel

storing the electrolyte and housing the wafer substrate, the counter electrode and the reference electrode that are immersed in the electrolyte(Fig. 5 #1-2).

Regarding claim 1, Nojiri teaches all the components of the claimed apparatus except the amended feature of an independent clip electrically coupled to a portion of the conductive layer on the substrate.

Zechman teaches electrolytically fabricating semiconductor circuits comprising positioning the semiconductor wafer and providing electrical current to the wafer via an annular clip(Fig. 1 #5).

Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated the annular contact clip as taught by Zechman into the electroetching apparatus of Nojiri in order to provide a large contact surface area to ensure adequate current flow as taught by Zechman(col. 3 lines 56-63).

In addition, the claimed substrate having sub-micron interconnect features does not lend patentability to the instantly claimed apparatus since the substrate is directed to a subject that is worked on by the claimed apparatus. It is well settled that "expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim". Ex parte Thibault, 164 USPQ 666, 667 (Bd. App. 1969). Furthermore, "[i]nclusion of material or article worked upon by a structure being claimed does not impart patentability to the claims." In re Young, 75 F.2d 996, 25 USPQ 69 (CCPA 1935) (as restated in In re Otto, 312 F.2d 937, 136 USPQ 458, 459 (CCPA 1963)). See MPEP 2115 [R-2].

Furthermore, the claim recitation of how the potential difference between the substrate and the reference electrode is maintained and when the selective removal of conductive layer is ended does not lend patentability to the instant apparatus claims since they are directed to how the claimed apparatus is being operated. It is well settled that a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). See MPEP 2114. Since the recited process limitations do not structurally differentiate the claimed apparatus from the apparatus of Nojiri in view of Zechman, the recited process limitations do not render the instant claim patentable.

Furthermore, with respect to the amended claim feature that the conductive layer "consisting of nickel", the examiner does not find that the claimed nickel conductive layer would render the instant claim 1 patentable since the nickel conductive layer is directed to the article worked on by the instantly claimed apparatus and does not provide any structural limitation that would differentiate the apparatus of claim 1 to the prior art. It is well settled that material or article worked upon does not limit apparatus claims. See MPEP 2115[R-2].

The examiner also maintains a position that the apparatus of Nojiri in view of Zechman is capable of performing in the claimed fashion.

Regarding claim 2, the apparatus of Nojiri in view of Zechman is capable of varying a current between the substrate and the counter electrode to maintain the potential different at a fixed value as claimed(col. 3 lines 11-28).

Regarding claims 3-7, the claimed conductive layer, barrier layer and the sub-micron interconnect features are directed to the wafer substrate which is worked on by the claimed apparatus. Therefore, these claim limitations does not lend patentability to the instant apparatus claims for the same reasons as stated in the rejection of claim 1 above. See MPEP 2115 [R-2].

8. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nojiri et al. US 5,173,149(Nojiri) in view of Shaw US 3,560,357(Shaw).

The teachings of Nojiri are discussed in paragraph 7 above. However, Nojiri does not explicitly teach the claimed amended feature of an independent clip electrically coupled to a portion of the conductive layer on the substrate.

Shaw teaches an apparatus for selective electroetching of a substrate(title). Shaw further teaches using a spring clip for positioning the substrate in an electrolytic bath and to provide electrical current to the substrate(Fig. 2 #19, col. 3 lines 55-68).

Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated the spring clip as taught by Shaw into the electroetching apparatus of Nojiri in order to hold and position the substrate in the electrolytic bath at the same time providing electrical current to the substrate as shown in Shaw.

The remaining claim limitations regarding claims 1-7 are rejected for the same reasons as stated in paragraph 6 above.

9. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nojiri et al. US 5,173,149(Nojiri) in view of Van Dijk US 3,616,345(Van Dijk).

The teachings of Nojiri are discussed in paragraph 7 above. However, Nojiri does not explicitly teach the claimed amended feature of an independent clip electrically coupled to a portion of the conductive layer on the substrate.

Van Dijk teaches an apparatus for selective electroetching of a substrate(title). Van Dijk further teaches using a clip for positioning the substrate in an electrolytic bath and to provide electrical current to the substrate(Fig. 4 #30-31, col. 4 lines 24-71).

Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated the spring clip as taught by Van Dijk into the electroetching apparatus of Nojiri in order to hold and position the substrate in the electrolytic bath at the same time providing electrical current to the substrate as shown in Van Dijk.

The remaining claim limitations regarding claims 1-7 are rejected for the same reasons as stated in paragraph 6 above.

Response to Arguments

10. Applicant's arguments filed 30 August 2007 have been fully considered but they are not persuasive.

In the remarks, applicant argues that none of the references, either alone or in combination, teaches the claimed feature of "a working electrode terminal to couple a portion of the conductive layer consisting of nickel ... by an independent clip".

The examiner does not find applicant's arguments persuasive because the claimed nickel conductive layer is directed to a material that the claimed apparatus

operates on, therefore, does not lend patentability to the instant apparatus claims. See paragraph 4 above.

Applicant also argues that Zechman does not cure the deficiency of Gealer because Zechman teaches "a ring type clip or holder 5 spaced from an parallel with the electrode."

The examiner does not find applicant's argument persuasive since Zechman teaches that the clip is connecting to the negative terminal and to the wafer(i.e. providing electrical current to the wafer via the clip(col. 3 lines 52-55), which meets the limitation of the claimed clip.

Applicant further argues that Shaw does not cure the deficiency of Gealer because Shaw's clip is in contact with the underlying tungsten film instead of the photoresist layer 14 on the surface of the substrate.

The examiner does not find applicant's argument persuasive since the Shaw's electroetching is directed to etching the underlying tungsten layer(col. 3 lines 42-52). In addition, applicant's argument is directed to the workpiece that is operated on by the claimed apparatus, therefore, does not lend patentable weight to the instant claimed apparatus.

Applicant further argues that Van Dijk does not cure the deficiency of Gealer because Van Dijk's clip is not connected to the workpiece. The electrical connection is made via platinum connection situated between one side of the clip and the workpiece.

The examiner does not find applicant's argument persuasive since the instant claim 1 only requires that "a working electrode terminal to couple to a portion of the

conductive layer ... from the substrate by an independent clip” and does not require the clip to be the electrical conductor. Therefore, the platinum connection connecting to the power source in the apparatus of Van Dijk is couple to the workpiece by the clip as claimed.

Applicant further argues that the electrical connection in the electroetching apparatus of Nojiri is connected to the metallic film 31, but the layer to be etched is p-type substrate 3a, which is not directly connected to the terminal.

The examiner does not find applicant’s argument persuasive since the instant claim only requires that “a working electrode terminal to couple to a portion of the conductive layer ... to be selectively removed from the substrate” and does not require that the working electrode terminal to be directly connected to the conductive layer to be selectively removed. Since all layers on the substrate as taught by Nojiri are conductive, the claimed coupling of the working electrode terminal and the conductive layer to be selectively removed has been established in the apparatus of Nojiri based on the broadest reasonable interpretation.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lois Zheng whose telephone number is (571) 272-1248. The examiner can normally be reached on 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1742

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LLZ

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